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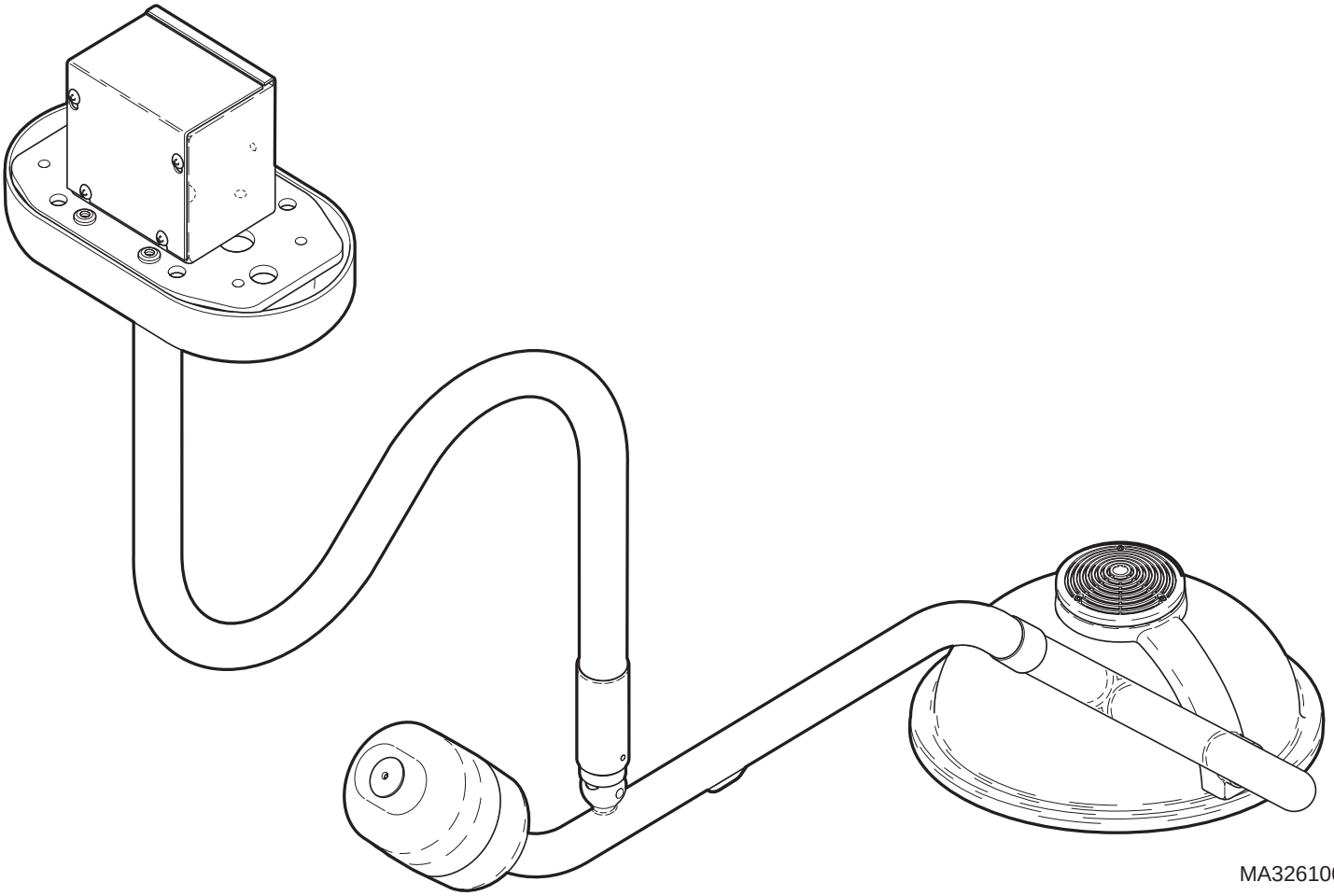
Installation Manual

355 Lighting System



MA326100

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Owner's Product Identification

(information that you'll need to provide for servicing - key information is highlighted)

Date of Purchase

Serial Number(s) - Dual light systems will have a serial number on each down tube

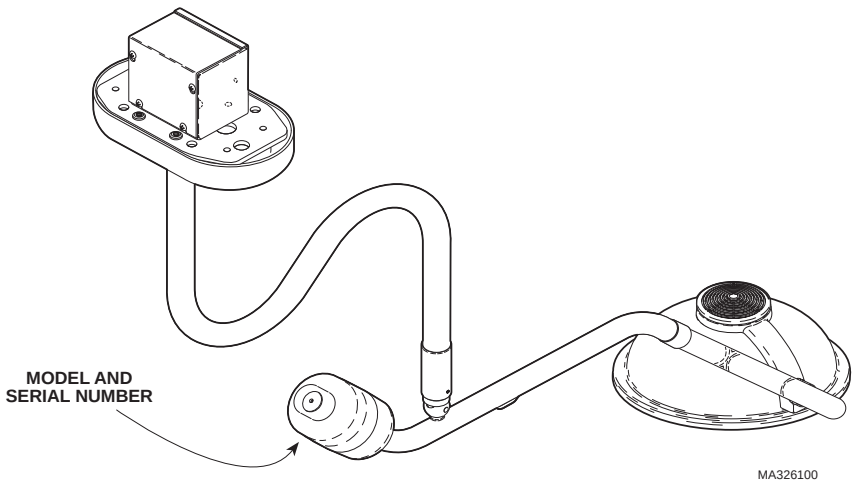
Name of Owner/Facility/Department

Model Number

Name of Authorized Dealer

Telephone # of Authorized Dealer

Address of Authorized Dealer



MA326100

Figure 1. Model Number / Serial Number

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SCOPE AND PURPOSE OF THIS MANUAL

This manual covers complete instructions for the installation of the Ritter 355 Lighting System and is intended to be used by personnel involved in the installation of the 355 Lighting System. The Operation Manual (Part No. 003-0806-00) for the 355 Lighting System is a separate document and is intended for persons who will operate the 355 Lighting System.

SAFETY INSTRUCTIONS

The primary concern of Midmark is that this equipment be operated and maintained with the safety of the users in mind. To assure safer and more reliable operation, do the following: (1) Read this manual before installing your light assembly; (2) Assure that appropriate personnel are informed on the contents of this manual--this is the responsibility of the purchaser; (3) Be sure that you understand the instructions contained in this manual before attempting to install this light assembly; (4) Be sure that you have read and understand the instructions contained in the Operation Manual (a separate document) before attempting to operate this equipment.

EXPLANATION OF SAFETY SIGNALS AND NOTES

Throughout this manual, there are danger, warning, caution, equipment alerts, and notes that call attention to particular procedures. The signal words and notes are used as follows:

DANGER
Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

WARNING
Indicates a potentially hazardous situa tion, which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a potentially hazardous situa tion, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

EQUIPMENT ALERT
Indicates an imminently or potentially hazardous situation, which, if not avoided, will or may result in serious, moderate, or minor equipment damage.

NOTE
Note is used to amplify an operating procedure, practice, or condition.

GENERAL INFORMATION

Lighting System

The 355 lighthead assembly is a fixed-focus, faceted reflector lighthead. The faceted reflector design of the lighthead provides excellent cavity penetration, while also controlling shadows from light-blocking objects. The design also results in bright, even distribution of light. The individual beams of light are arranged to provide an evenly illuminated 8 inch diameter beam at a distance of 36 inches. The peak illumination at 36 inches is at least 4,000 fc (43,000 lux). The optical system filters out most of the infrared heat from the prefocused pattern of light.

The plastic handle can be easily removed for sterilization or it accepts a Devon EZ Handle™ without requiring an awkward adapter. The lighthead is made with a color molded, lightweight polymer resulting in a very lightweight lighthead which is easy to position. The optical system is powered by a 12 VAC, 100 Watt bulb.

The arm assemblies (suspension system) have been precisely designed, assembled, and balanced so that the lighthead can be positioned with minimal force with no drifting occuring. In addition, the three pivots with 540° of rotation make the positioning of the lighthead easy and flexible.

Specifications

See Figure 1 and Table 1 for specifications on the 355 Lighting System.

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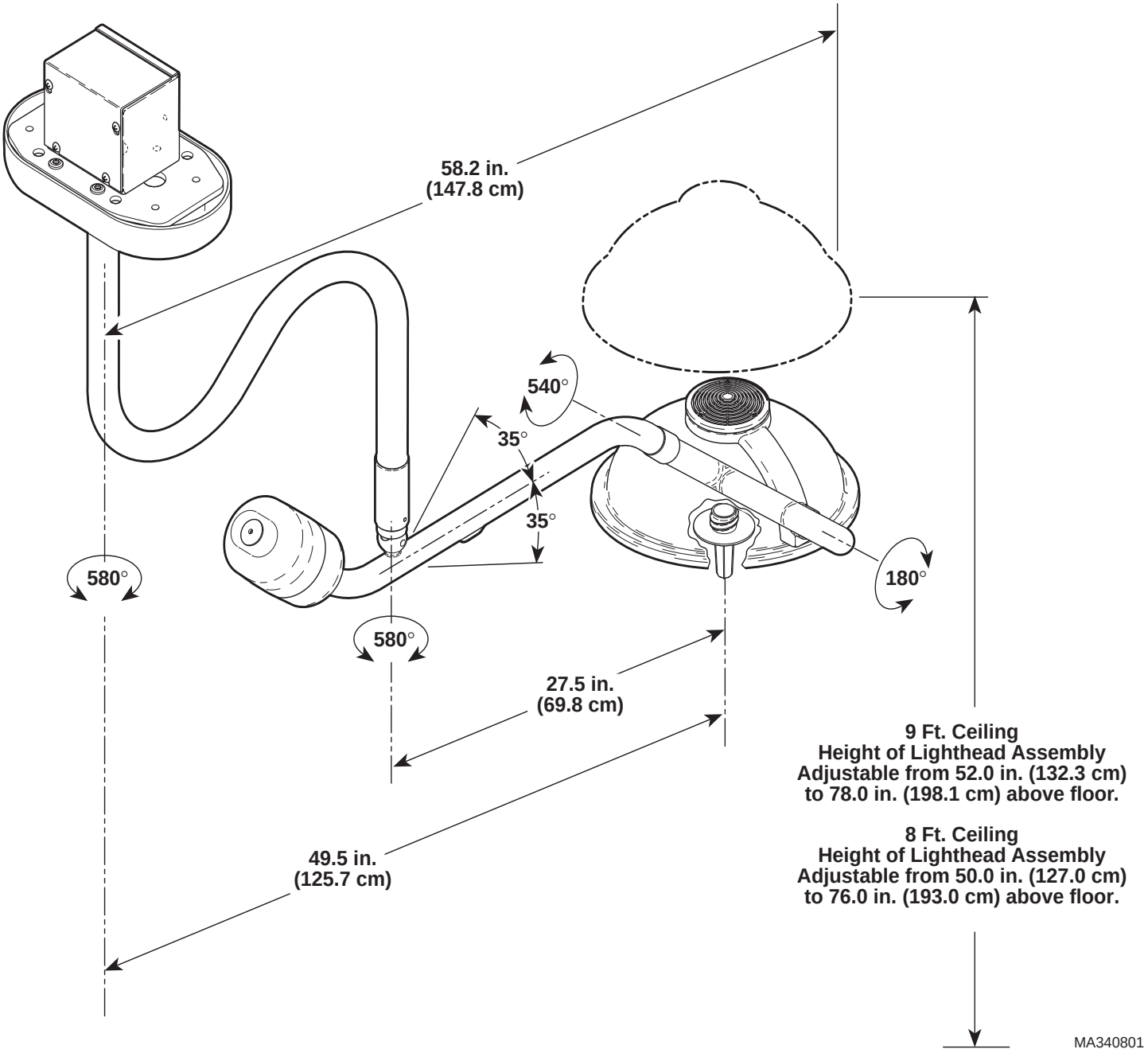

Figure 1. Specifications

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Table 1. Model 355 Specifications

Beam diameter @ 36 inches:	8" (defined by 20% of peak illumination)
Bulb:	(Qty:1) - 100 W halogen lamp
Color temperature:	3,200K
Diameter of lighthead:	17"
Focal length:	36"
Illumination:	4,000fc, 47,000 lux
Power requirement:	120 VAC, 1.25 A, single phase
Power to lights:	11.2 VAC, 8.5 A
Reach of arm assemblies:	48" maximum (from centerline of down tube to center of lighthead)
Rotation of lighthead:	180° rotation at lamp tube connection
Rotation of lamp tube:	540° rotation at cross tube connection
Rotation of cross tube:	580° rotation at down tube connection
Vertical movement of cross tube:	-35° to +35° vertical movement
Rotation of down tube:	580° rotation at ceiling plate connection
Weight of 8 ft (2.44 m) single light assembly:	54 lbs. (24.5 kgs.)
Weight of 9 ft (2.74 m) single light assembly:	55 lbs. (24.9 kgs.)
Weight of 8 ft (2.44 m) dual light assembly:	100 lbs. (45.3 kgs.)
Weight of 9 ft (2.74 m) dual light assembly:	102 lbs. (46.3 kgs.)

355 LIGHTING SYSTEM INSTALLATION

Unpacking

NOTE

Below is a list of all the items which should be included in the shipping box(es). The first quantity indicates the number of items which should be present for a single lighting assembly while the second quantity indicates the number of items which should be present for a dual lighting assembly (Refer to Figure 2).

1. Cut banding and remove box lid from box.

2. Remove one/two cross tube/lighthead assembly (1, Figure 2) and inspect.

3. Remove one/two down tube assembly (2) and inspect.

4. Remove one/two cotton bag (3) and inventory contents; the following items should be included:
   - 3a. Four #10-24 x 3/4" socket cap screws
   - 3b. Two/four #10-24 x 3/8" black oxide button head screws
   - 3c. One/two #8-32 x 3/8" phillips head screw
   - 3d. Six/twelve 3/8"-16 hex nuts
   - 3e. Three/six 3/8" lockwashers
   - 3f. One/two 100 W Halogen bulb
   - 3g. Five/ten yellow wire nuts
   - 3h. Two/four grey wire nuts
   - 3i. One/two cable ties
   - 3j. One/two housing caps
   - 3k. One/two #10-24 x 5/8" zinc plated button head screws

5. Remove one ceiling plate assembly (4) and inspect.

6. Remove one/two sterilizable handle (5) and inspect.

7. Remove one ceiling cover (6) and inspect.

Recommended Ceiling Mounting Locations

See Figure 3 for recommended ceiling mounting locations. These locations allow the lighthead to be positioned over any portion of the patient's body without running into a physical arm restriction; mounting the light system on the centerline of the table or headrest will result in some areas of the patient's body not being able to be illuminated by the lighthead. Also, the light system should be mounted on the opposite side of the table as the doctor's work position, so the light system is not hanging above the doctor's head.

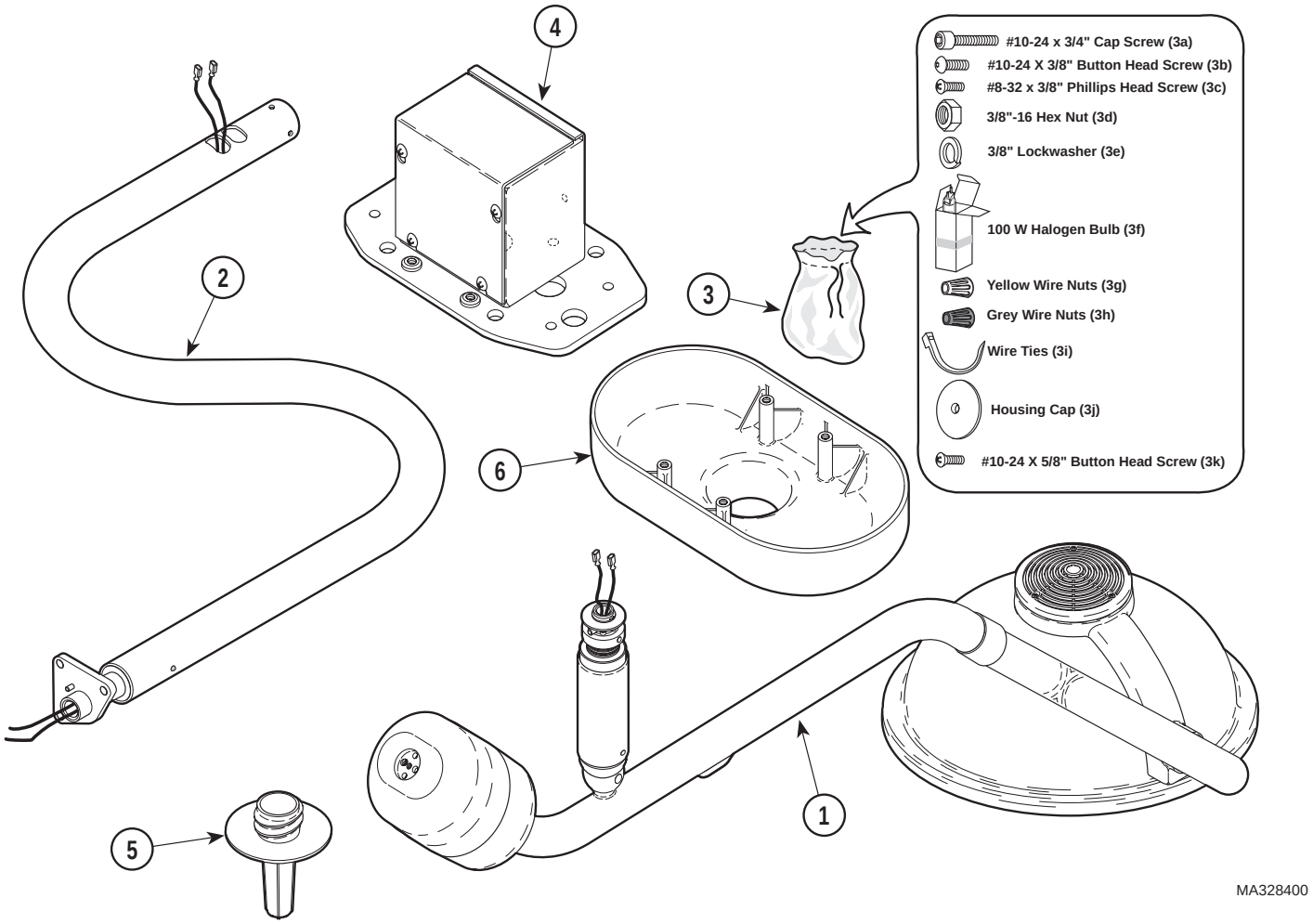


Figure 2. Components Unpacking and Inventory

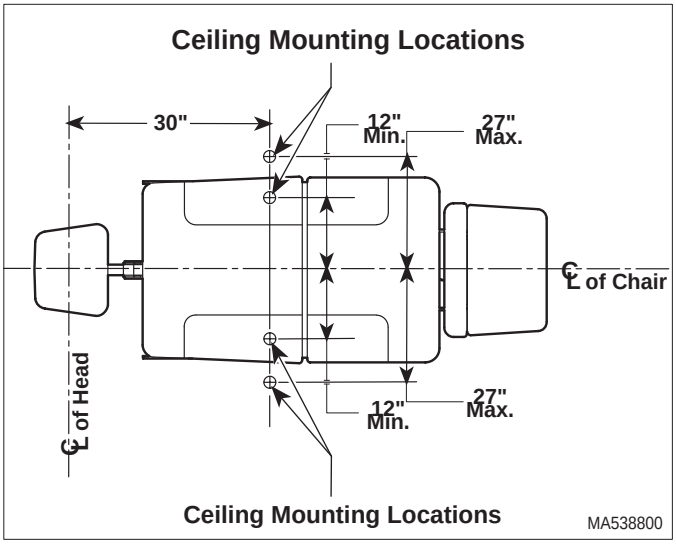


Figure 3. Recommended Ceiling Mounting Locations

Ceiling Support Structure Installation

Weights:

- 8 ft (2.44 m) Single 355 Lighting System (less customer supplied ceiling structure): ..... 54 lbs (24.5 kgs)
- 9 ft (2.74 m) Single 355 Lighting System (less customer supplied ceiling structure): ..... 55 lbs (24.9 kgs)
- 8 ft (2.44 m) Dual 355 Lighting System (less customer supplied ceiling structure): ..... 100 lbs (45.3 kgs)
- 9 ft (2.74 m) Dual 355 Lighting System (less customer supplied ceiling structure): ..... 102 lbs (46.3 kgs)

Torques:

- 8 ft (2.44 m) Single 355 Lighting System: ..... 68 ft-lbs (92.1 N•m)
- 9 ft (2.74 m) Single 355 Lighting System: ..... 68.2 ft-lbs (92.5 N•m)
- 8 ft (2.44 m) Dual 355 Lighting System: ..... 133 ft-lbs (180.3 N•m)
- 9 ft (2.74 m) Dual 355 Lighting System: ..... 135 ft-lbs (183.0 N•m)

NOTE

The illustrations in Figure 4 are for suggestion only. Midmark does not supply ceiling structures. Consult a structural engineer for the best solution for your situation.

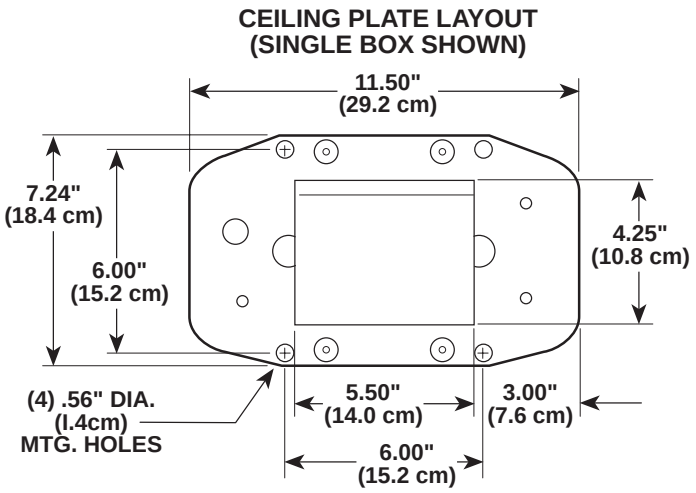
The 355 Lighting system requires a sturdy ceiling support structure to support the weight and the dynamic torque which will be applied to the support structure (See Figure 4).

The ceiling support structure must be strong enough to uphold the weight of the system and support the rotating suspension arms and lighthead(s) without deflection.

The 355 lighting system is engineered for ease of movement during positioning. The arm assemblies and lightheads(s) will rotate with a minimum of force, provided the arm assemblies are leveled and stay level. If, however, the ceiling support is weak and flexes, the weakness will have a negative impact on the operation of the arm assemblies during positioning.

If the ceiling support structure flexes too much, the lighthead(s) will drift to the lowest point. Although the arms are equipped with brakes to prevent drift, the undesirable side effect of stiffer braking, is that the arm assemblies / lighthead(s) will be harder to move. For a set of arm assemblies to rotate without drift and a minimum amount of force, the ceiling plate assembly must not be allowed to deflect more than 1/16" over a 12" distance. The ceiling plate must be level and stay level when the arm assemblies are rotated in every position and all worst case scenarios (example: two sets of arm assemblies on one side). This means that the ceiling support structure must be braced in multiple directions.

The 355 lighting system comes in two different versions: an 8 foot version for an 8 foot ceiling and a 9 foot version for a 9 foot ceiling. The bottom of the ceiling plate



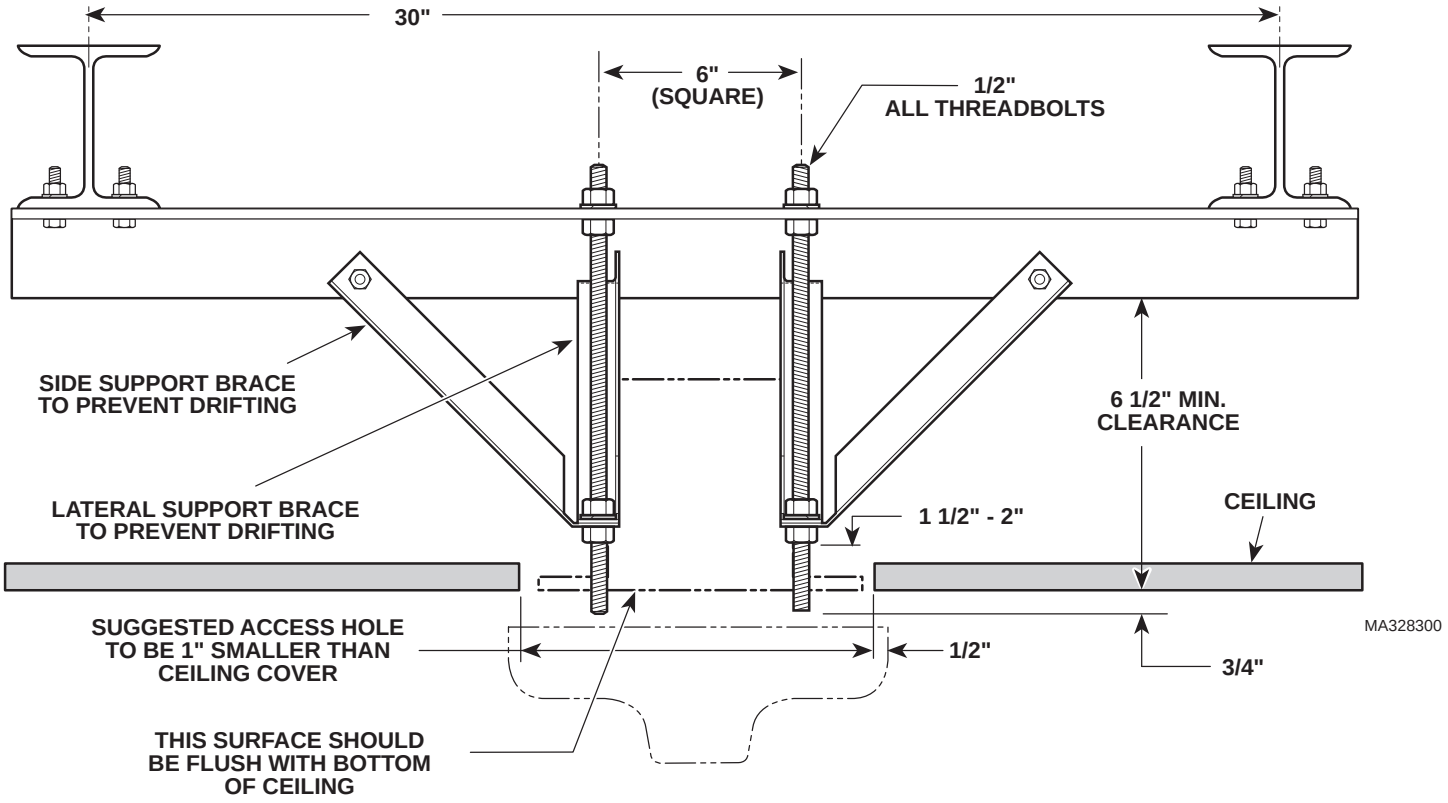


Figure 4. Suggested Ceiling Support Structure Installation

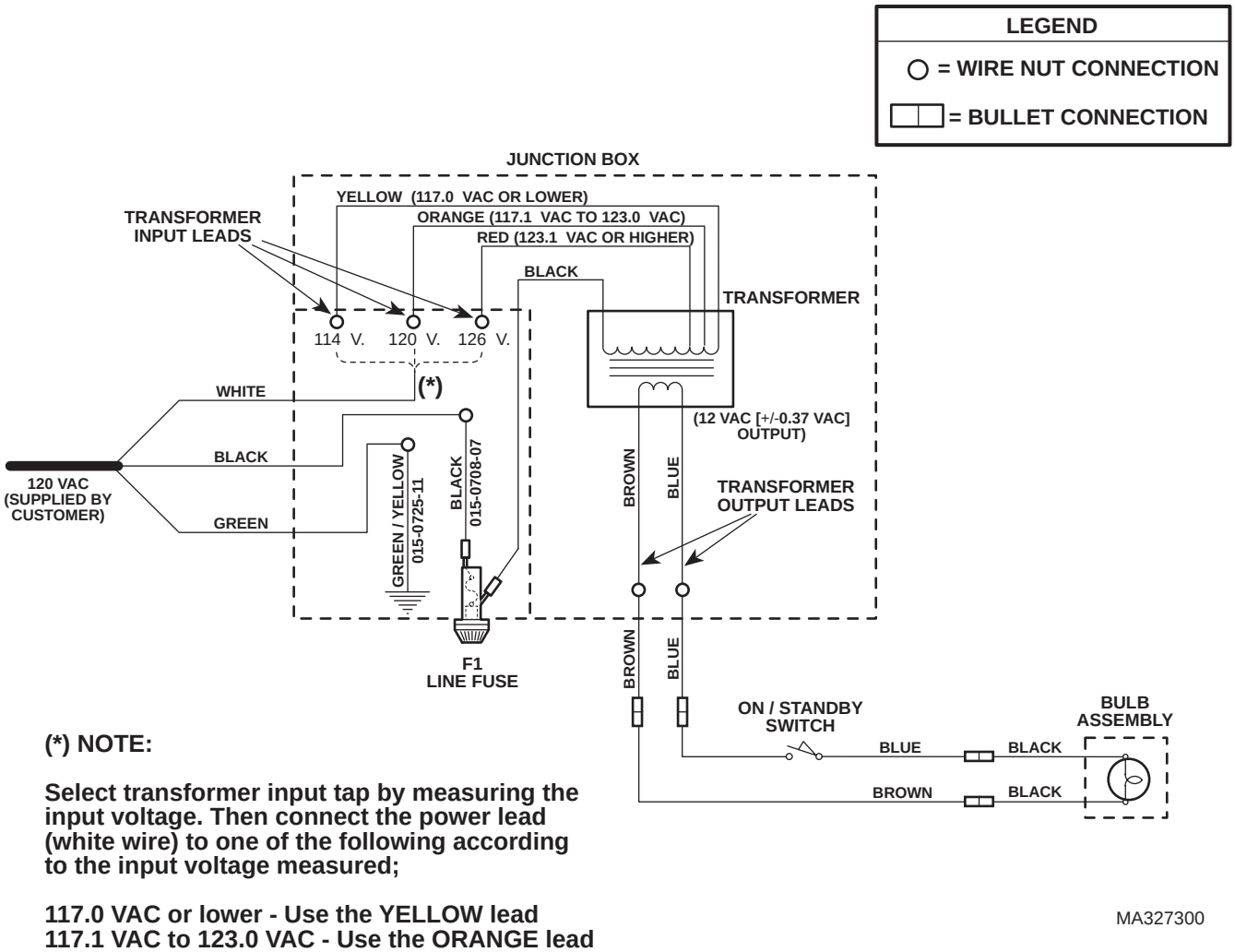


Figure 5. Wiring Diagram

assembly must be installed so it is flush with the finished surface of the facility's ceiling. See Figure 4. The ceiling cover is designed to fit up against the finished ceiling.

Wiring Installation

The wiring, supplying power to the junction box of the 355 lighting system, must be supplied by the customer. The 355 lighting system requires 120 VAC input voltage. The wire should be 2-conductor with ground, 14 gauge copper wiring, rated for 120 VAC. The customer supplied wiring must be connected to the junction box with some form of strain relief fitting, preferably a conduit fitting. Connect and route the wiring according to state and local codes, using conduit where necessary. See wiring diagram, Figure 5.

Junction Box Wiring Connections (See Figure 5)

WARNING
Make sure facility supplied wiring is turned to off for the following step. Failure to do so could result in electrical shock causing serious personal injury or death.

1. Turn off facility power breaker so there ***is no*** power in customer supplied wiring.
2. Loosen four screws (1, Figure 7); then lift up on box cover (2) and remove from junction box (3).
3. Install conduit fitting (customer supplied) in the desired knockout(s) of the junction box (3).
4. Feed the facility supplied wiring through the knock-outs in the junction box (3).

WARNING

Make sure facility supplied wiring is not shorted to junction box and do not touch wires during steps 5 and 6. Failure to do so could result in electrical shock causing serious personal injury or death.

5. Turn on facility power breaker so there ***is*** power in customer supplied wiring.

6. Using a multimeter, measure the input voltage between black power lead and white neutral lead of customer supplied wiring. Record this voltage. See Figure 5.

WARNING

Make sure facility supplied wiring is turned to off for the following step. Failure to do so could result in electrical shock causing serious personal injury or death.

7. Turn off facility power breaker so there ***is no*** power in customer supplied wiring.

8. If voltage measured in step 6 was 117.0 VAC or lower, connect the white neutral lead of customer supplied wiring to the yellow transformer input lead using one of the Midmark supplied yellow wire nuts (see Figure 5).

   If voltage measured in step 6 was between 117.1 to 123.0 VAC, connect the white neutral lead of customer supplied wiring to the orange transformer input lead using one of the Midmark supplied yellow wire nuts (see Figure 5).

   If voltage measured in step 6 was 123.1 VAC or higher, connect the white neutral lead of customer supplied wiring to the red transformer input lead using one of the Midmark supplied yellow wire nuts (see Figure 5).

9. Connect the black power wire from customer supplied wiring to the black wire in the junction box using one of the Midmark supplied yellow wire nuts.

10. Connect the green earth ground wire from customer supplied wiring to the green/yellow wire in the junction box using one of the Midmark supplied yellow wire nuts.

11. Screw one Midmark supplied grey wire nut on each of the two unused transformer input taps.

CAUTION

Failure to properly connect and insulate wires in junction box could result in a short or electrical shock to personnel.

- **Always use a strain relief (conduit fitting) between facility wiring and the junction box.**
- **Always wire nut all wires inside junction box.**
- **Always wrap and secure the wire nuts with electrical tape.**
- **Always connect the earth ground wires inside the junction box.**

12. Wrap and secure all wire nuts with electrical tape.

13. If light system is a dual light, repeat steps 1 through 12 for the remaining junction box.

NOTE

It is especially important to perform steps 14 and 15 now if the ceiling is a drywall/plastered ceiling; these steps cannot be performed later.

14. Feed brown and blue transformer output wires out of wire hole (7, Figure 7) in bottom of junction box.

15. Position box cover (2) on junction box (3) and secure by tightening four screws (1).

Ceiling Plate Assembly Installation

NOTE

The following step describes one typical way of mounting the ceiling plate assembly. However, this method may not work for all installations; if not use the following procedure for guidance only.

1. Install four 1/2" nuts (1, Figure 6) on four all-thread bolts (2) (not supplied) as far as possible.

2. Install ceiling plate assembly (3) on four all-thread bolts (2) and secure with four 1/2" lockwashers (4) and 1/2" nuts (5).

NOTE

For the following step, make sure nuts (1) ***are not*** contacting the ceiling plate assembly (3). Otherwise, leveling of ceiling plate assembly with nuts (5) will not be possible.

3. Adjust four nuts (5) until bottom of ceiling plate assembly (3) is flush with surface of ceiling.

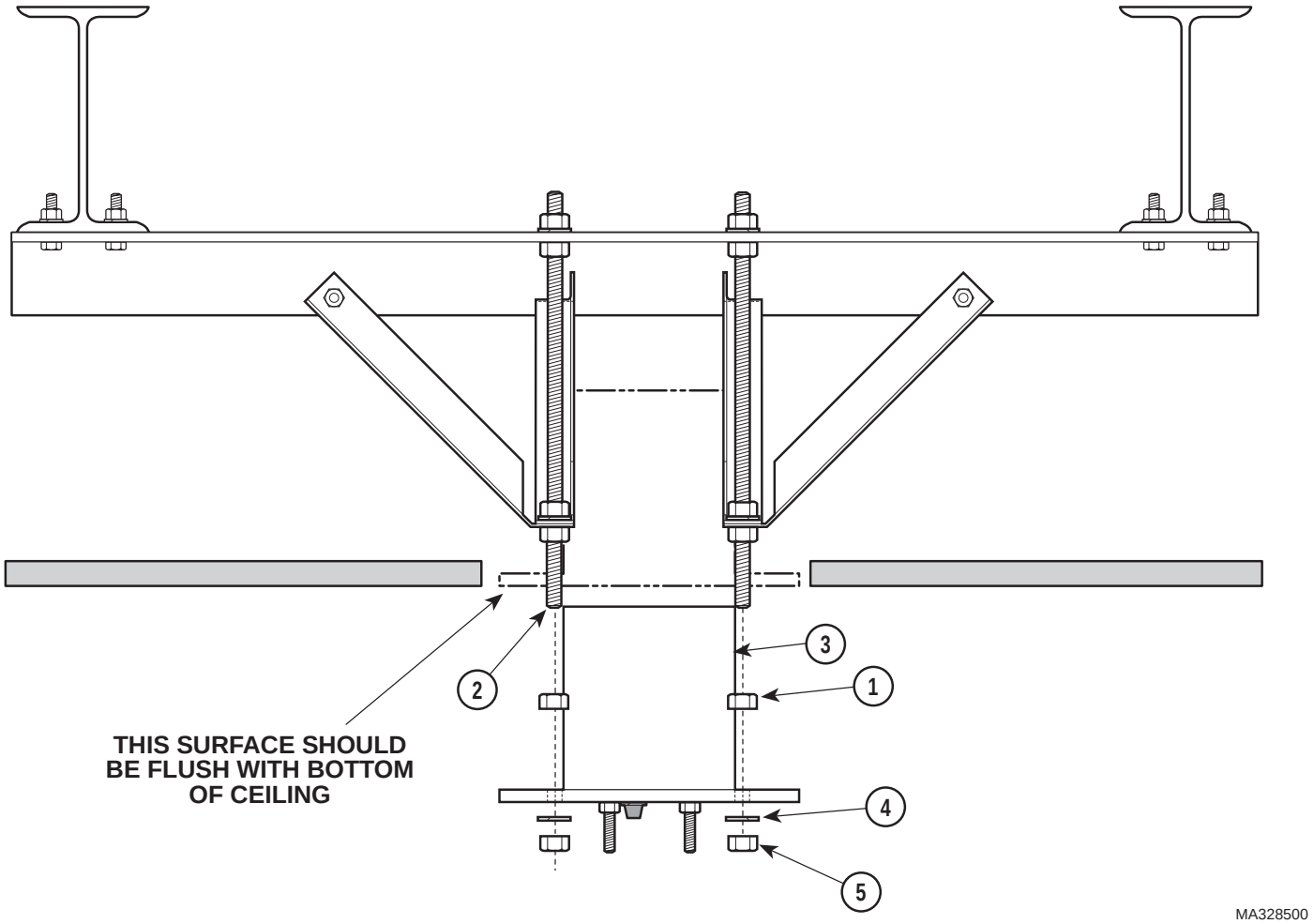


Figure 6. Suggested Ceiling Plate Assembly Installation

WARNING
Failure to install nuts (5) so that there are at least two full threads visible below nuts, could result in unit falling.

4. Use a level to check the levelness of ceiling plate assembly (3) in all directions. Adjust four nuts (5) as necessary until the ceiling plate assembly (3) is level in all directions and flush with surface of ceiling.

5. Tighten nuts (1) against ceiling plate assembly (3); then recheck levelness of ceiling plate and readjust if necessary.

Down Tube Installation

1. Thread three 3/8" x 16 hex nuts (4, Figure 7) (supplied) onto three bolts (5) until they are handtight; then back off each nut 1 full turn.

2. Position down tube (6) near wire hole (7).

3. Connect brown wire from junction box (3) to brown wire from down tube (6) using one of the supplied yellow wire nuts.

4. Connect blue wire from junction box (3) to blue wire from down tube (6) using one of the supplied yellow wire nuts.

5. Wrap and secure both wire nuts with electrical tape.

6. Install down tube (6) on three bolts (5) and secure with three 3/8" lockwashers (8) and 3/8" x 16 hex nuts (9) (supplied).

WARNING
Failure to install nuts (9) so that there are at least two full threads visible below nuts, could result in unit falling.

7. Under normal circumstances, the down tube (6) should be level enough to provide drift-free operation. If, after complete assembly and operation of the light system, drifting is observed, adjust nuts (9) until down tube (6) is vertical (+/- 0.5°); then tighten nuts (4).

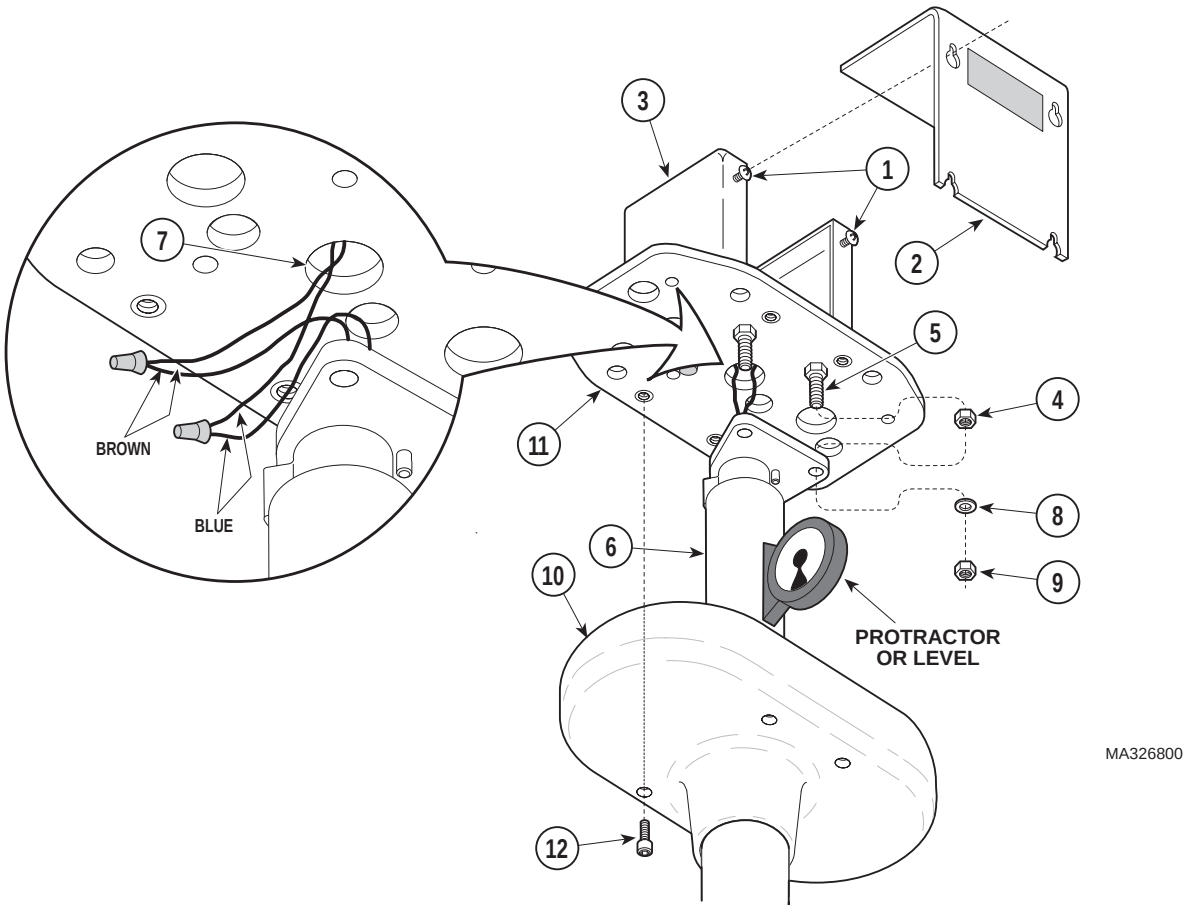


Figure 7. Down Tube Installation

8. If light system is a dual light, repeat steps 1 through 7 for remaining down tube (6).

9. Slide ceiling cover (10) onto down tube(s) (6).

10. Attach ceiling cover (10) to ceiling plate (11) with four #10-24 x 3/4" screws (12) (supplied).

Cross Tube Assembly Installation

1. Slide ball pivot sleeve (1, Figure 8) onto down tube (2), making sure screw hole in sleeve is towards the bottom.

2. With ball pivot sleeve (1) positioned as high as possible on down tube (2), pull blue and brown wires (6) through top window (A) of down tube.

NOTE

There are three screw holes in cross tube (3); two of the holes are larger and have a courser thread. Use these two holes to secure cross tube assembly with screws (5). The other hole is for securing ball pivot sleeve.

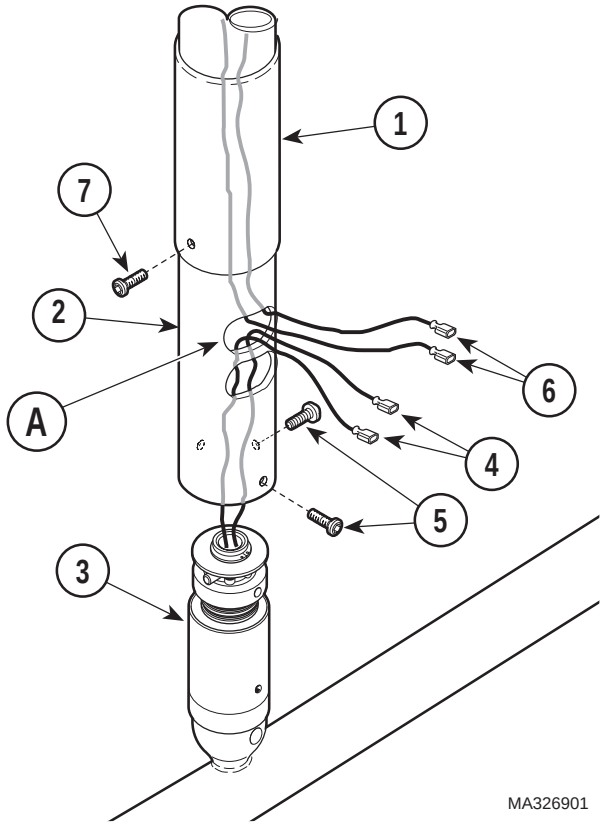


Figure 8. Cross Tube Assembly Installation

3. Align three screw holes; then insert pivot shaft of cross tube assembly (3) into down tube (2). Secure cross tube assembly in position with two #10-24 x 3/8" black oxide button head screws (5).

4. Feed two wires (4) through top window (A) of down tube (2).

5. Connect brown wire (4) to brown wire (6) and blue wire (4) to blue wire (6). Push wires into top window (A).

6. Slide ball pivot sleeve (1) down into position and secure with one #8-32 x 3/8" phillips head screw (7).

Bulb Installation

NOTE

Screws (1) are captive screws. Only loosen captive screws; do not try to remove them.

1. Loosen three captive screws (1, Figure 9) and separate top cap (2) from support arm pivot (3).

2. Remove packing material from inside of lighthead.

NOTE

Halogen bulbs are sensitive to body oils. Be sure not to touch the glass portion of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If the glass portion of the bulb is handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

3. Using a cotton glove or similar clean cloth, grasp the new bulb (4) (supplied) and insert new bulb into bulb socket (5). Push bulb in until its prongs bottom out; there should be approximately 1/16 in. (1.6 mm) gap between bulb socket and glass base of bulb. Forcing bulb in further will cause damage.

NOTE

The top cap is keyed which allows it only to be installed in one position.

4. Align the key of the top cap (2) with key hole in support arm pivot (3). Then secure top cap (2) on support arm pivot (3) by tightening three captive screws (1). Make sure wiring (6) is tucked up above light block as much as possible and does not hang down into path of light.

Housing Cap Installation

1. Install housing cap (2, Figure 12) on ballast housing (3) and secure with screw (1).

Operational Test

1. Turn the ON / STANDBY switch (A, Figure 10) to ON.

2. Observe. The light should illuminate.

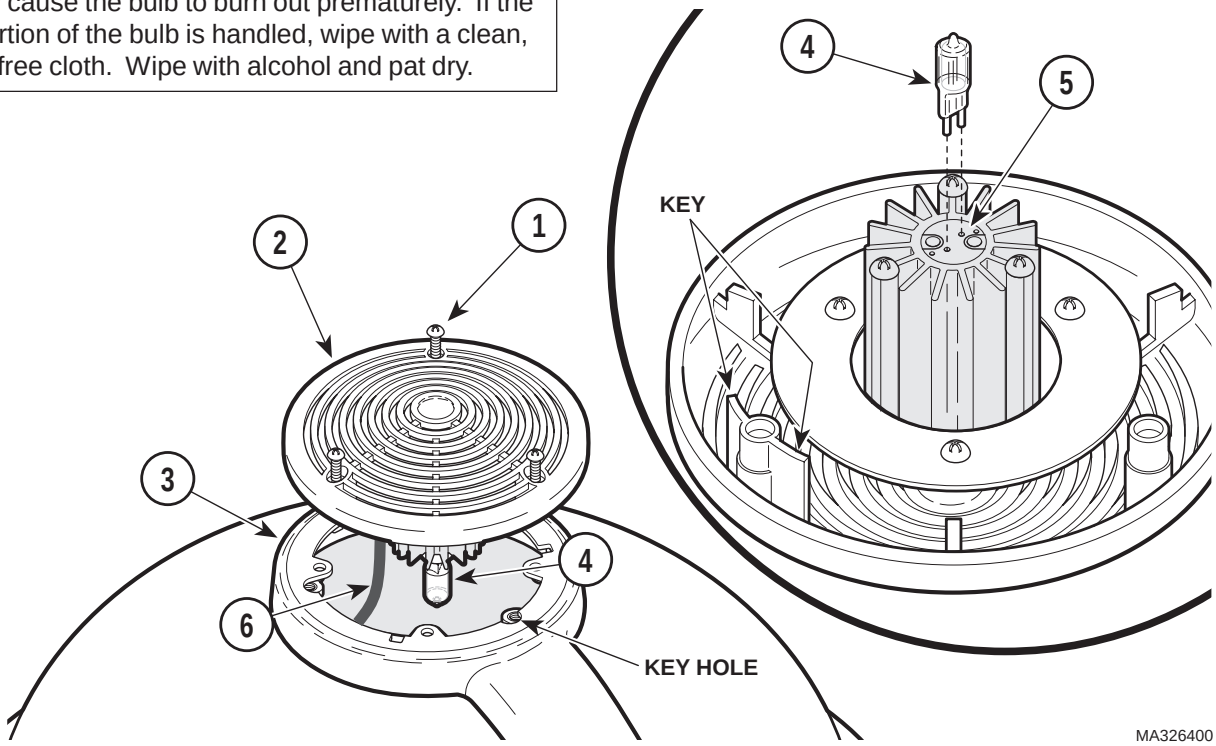


Figure 8. Bulb Installation

3. Position the light 36" from the table and aim the light at the table.

4. Observe. There should be an evenly distributed circular pattern of bright light, approximately 8 inches in diameter, on the table surface.

5. Rotate the lighthead, lamp tube, cross tube, and down tube through their range of motions as shown on the illustration (See Figure 10). Release the lighthead at different positions.

6. Observe. The lighthead should be able to be positioned easily through the entire range of its motion. When the lighthead is released in any position, no drifting should occur at any axis.

7. If any problems are discovered, refer to the trouble-shooting guide for adjustment and repair tips.

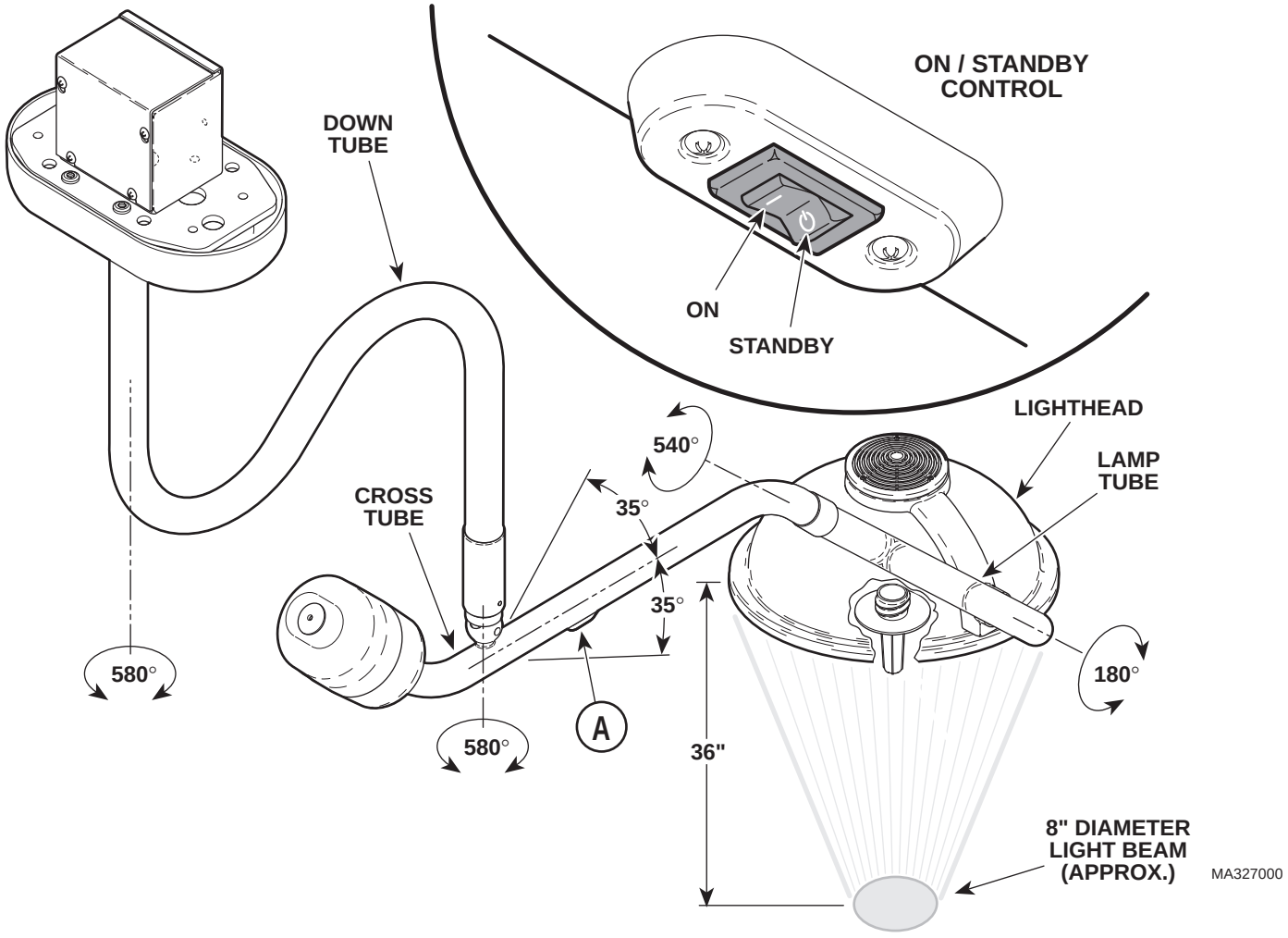


Figure 10. Operational Test

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TROUBLESHOOTING

Troubleshooting Guide

If any problems are discovered during the installation process, refer to the following table (Table 1) to determine the cause of the problem.

TABLE 1. TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
no light from lighthead	*lighthead is off*	turn on / standby switch to on
no light from lighthead; on / standby switch is on	*bulb has burned out or has not been installed*	refer to bulb installation procedure in this manual
	fuse in junction box is blown	inspect/replace the fuse located inside the ceiling cover
	no power to the junction box	check for facility power to the junction box
	transformer is malfunctioning	check for 12 VAC output from transformer.
no light from lighthead although the bulb and fuse were checked; lighthead flashes intermittently when lighthead or arms are moved	*circuit or wiring problem within arm assemblies, junction box, or other part of lighting system*	check all wiring connections. If problem persists, call Midmark Technical Support: 1-800-Midmark
down tube does not rotate freely or drifts when released in desired position	*improper installation of ceiling plate (deflects too much or is not level)*	check for excessive flexing of ceiling support structure and/or check if ceiling plate is level. Readjust as necessary.
lamp tube does not rotate freely or drifts when released in desired position	*brake tension needs adjusted*	Call Midmark Technical Support: 1-800-Midmark
cross tube rotates (at ball pivot joint) too stiffly or drifts when released in desired position	*ball pivot joint tension needs to be adjusted or cross tube counterbalance needs adjusted*	refer to ball pivot joint tension adjustment procedure in this manual. If proper tension cannot be achieved, refer to the cross tube counterbalance adjustment procedure in this manual and then repeat main pivot joint tension adjustment. If problem still persists, call Midmark Technical Support: 1-800-Midmark
lighthead does not rotate freely at lamp tube or drifts when released in desired position	*brake needs adjustment*	Call Midmark Technical Support: 1-800-Midmark

ADJUSTMENTS

Ball Pivot Joint Tension Adjustment

1. Remove screw (1, Figure 11) and slide ball pivot sleeve (2) up out of way.

2. Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

NOTE

There are three settings which the ball pivot cam (5) can be set for: light tension, medium tension, or stiff tension (see Figure 11). These settings may be changed according to the operator's preference.

3. Insert screwdriver, into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the desired tension setting.

4. Remove the screwdriver and move the cross tube (3) about the ball pivot joint in a circular motion and up and down motion to ensure the setting is the one desired. Move the cross tube (3) to a horizontal position and release it. The cross tube should not drift in any direction. If it does, a higher tension setting is required. Repeat steps 3 and 4 until the desired tension adjustment is achieved with no drifting of the cross tube. If a satisfactory tension adjustment cannot be achieved, perform the cross tube counterbalance adjustment procedure and then repeat the ball pivot joint tension adjustment procedure.

5. Slide ball pivot sleeve (2) down into position and secure with screw (1).

Cross Tube Counterbalance Adjustment

1. Remove screw (1, Figure 11) and slide ball pivot sleeve (2) up out of way.

2. Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

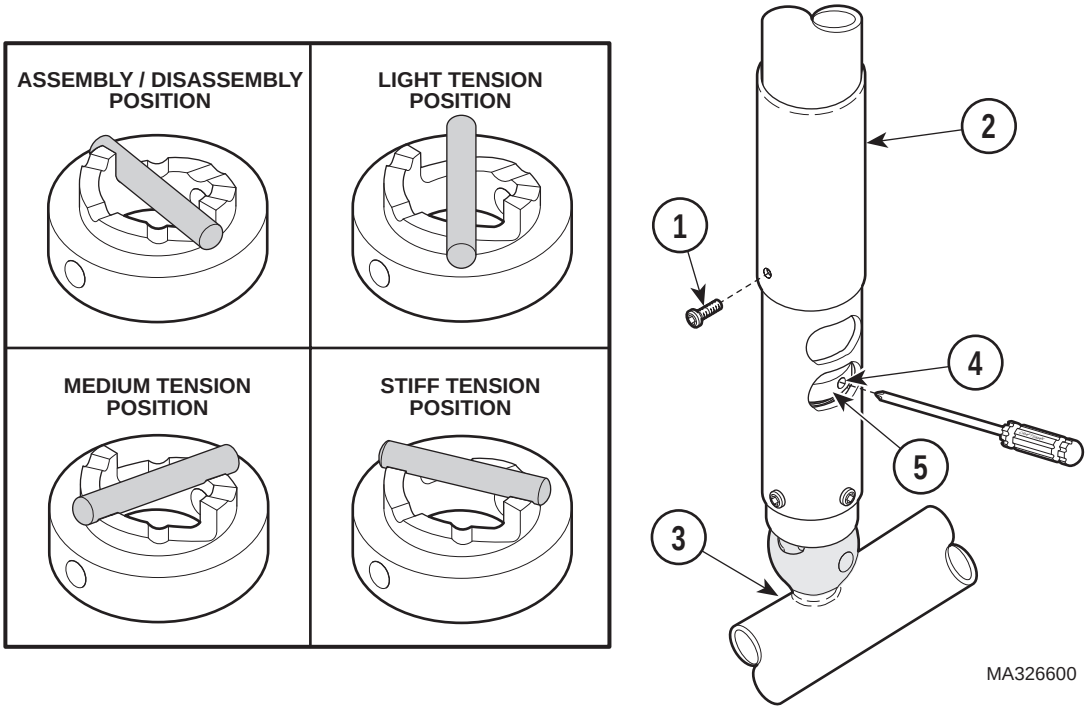

Figure 11. Ball Pivot Joint Tension Adjustment

3. Insert screwdriver, into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the assembly / disassembly setting. Remove screwdriver.

4. Remove screw (1, Figure 12) and housing cap (2) from ballast housing (3).

NOTE

One way to determine if cross tube is balanced properly is to raise the cross tube above horizontal, release it, and observe where it stops. Then lower the cross tube below horizontal plane, release it, and observe where it stops. The cross tube should return to the horizontal position and remain there; if it does, the cross tube counterbalance is adjusted properly.

Turning screw (4) in clockwise direction will raise the lighthead end of cross tube. Turning screw (4) in counterclockwise direction will lower the lighthead end of cross tube.

5. Adjust screw (4) until cross tube (5) balances in a horizontal position.

6. Install housing cap (2) on ballast housing (3) and secure with screw (1).

NOTE

It is recommended that you start with the light setting and then proceed to the medium or stiff setting only if necessary to prevent drifting.

7. Insert screwdriver, into adjustment hole (4, Figure 11). Then, using the screwdriver, rotate ball pivot cam (5) to the light, medium, or stiff setting as desired by the operator(s). Remove screwdriver.

8. Slide ball pivot sleeve (2) down into position and secure with screw (1).

CALLING FOR SERVICE

If you have a problem that you can't solve, have the information on the inside front cover of this manual completed and available and call:

1-800-Midmark (1-800-643-6275); 8:00 AM until 5:00 PM (Eastern Standard time in the U.S.); Monday thru Friday, except for standard U.S. holidays.

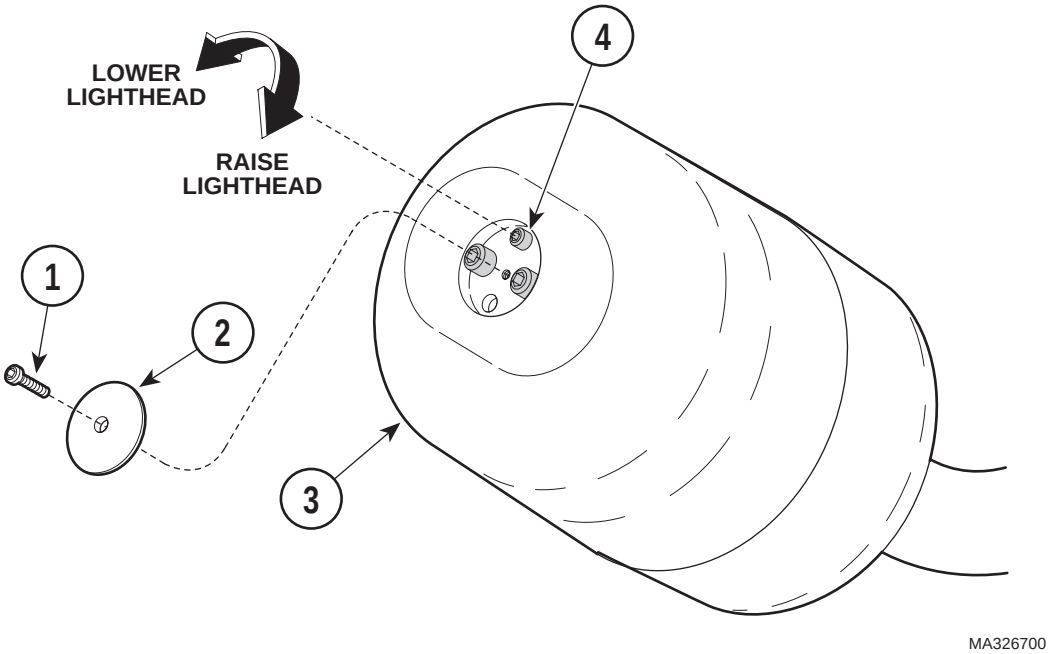

Figure 12. Cross Tube Counterbalance Adjustment

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LIMITED WARRANTY

SCOPE OF WARRANTY

Midmark Corporation ("Midmark") warrants to the original purchaser its new Alternate Care products and components (except for components not warranted under "Exclusions") manufactured by Midmark to be free from defects in material and workmanship under normal use and service. Midmark's obligation under this warranty is limited to the repair or replacement, at Midmark's option, of the parts or the products the defects of which are reported to Midmark within the applicable warranty period and which, upon examination by Midmark, prove to be defective.

APPLICABLE WARRANTY PERIOD

The applicable warranty period, measured from the date of delivery to the original user, shall be one (1) year for all warranted products and components.

EXCLUSIONS

This warranty does not cover and Midmark shall not be liable for the following: (1) repairs and replacements because of misuse, abuse, negligence, alteration, accident, freight damage, or tampering; (2) products which are not installed, used, and properly cleaned as required in the Midmark "Installation" and or "Installation / Operation Manual for this applicable product. (3) products considered to be of a consumable nature; (4) accessories or parts not manufactured by Midmark; (5) charges by anyone for adjustments, repairs, replacement parts, installation, or other work performed upon or in connection with such products which is not expressly authorized in writing in advance by Midmark.

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